

ABSTRACT

A reaction vessel which includes internally placed temperature controlling mixing baffles in which liquid is boiled, resulting in an isothermal heat sink. The energy of vaporization is supplied by the reaction vessel contents. The vapor produced by the boiling may be directed to channel coils which surround the outside of the reaction vessel wall. The channel coils contact the outside wall of the reaction vessel perpendicularly, and provide mechanical support for the reaction vessel. The mechanical support from the channel coils allows for a decrease in the thickness of the reaction vessel wall and corresponding increased heat transfer efficiency between the channel coil contents and the reaction vessel contents. The entire above described apparatus is enclosed within an evacuated shell to provide additional insulation. The apparatus includes a gravitationally powered device that ensures that saturated or sub-cooled liquid enters the isothermal mixing baffles, thus guaranteeing that isothermal phase change will occur therein